

**CLAIMS**

1. A process of handling solution of sucrose intermediates and derivatives, including, chlorinated sucrose, comprising:

5 a) removal of liquids from the said solution by direct drying, under conditions mild enough to prevent degradation or modification of

chlorinated sucrose, for recovery of solids from the said liquids and the end product of such operations is a solid mass of the chemicals visibly free from the said liquid;

10 b) recovering the said solids, present in the said liquid either in substantially pure form or with other solid impurities;

c) the said liquids being obtained in a process of producing chlorinated sucrose, mainly 1',6' Dichloro-1',6'-Dideoxy- $\alpha$ -D-Fructo-Furanosyl-4-Chloro-4-Deoxy- $\alpha$ -D-Galactopyranoside;

15 the said method of drying including one or a combination of, agitated thin film drying, spray drying, freeze drying and super critical extraction.

wherein the process of production of chlorinated sucrose comprises of,

20 i) deacylation of intermediates of chlorinated sucrose before as well as after drying of the chlorination reaction mixture by mild drying methods described above;

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- ii) use of alkali metal oxides as well as alkoxides, including Potassium Methoxide or Sodium Methoxide, for deacylation;
- iii) achieving deacylation up to pH of 9 but well below pH 11.

2. The process of claim 1, wherein the chlorinated sucrose (or its intermediates or derivatives) containing liquid is a mixture of the respective substantially pure forms as well as of several solid ingredients of other chemicals in dissolved or suspended state.
3. The process of claim 2 wherein the individual ingredients of the said mixture of solids, containing chlorinated sucrose (or its intermediates or derivatives) as one of the ingredients, originate from reactants of a process undertaken for chlorination of sucrose-6-esters.
4. The process of claim 3 wherein the sucrose-6-ester is sucrose-6-acetate or sucrose-6-benzoate.
5. The process of claim 4 wherein the chlorinating reagent is any one suitable for chlorinating sucrose-6-ester.
6. The process of claim 5 wherein the said chlorinating reagent is a Vilsmeier reagent of the formula  $[XClC=NR_2]^+Cl^-$  (where R represents an alkyl group and X represents a hydrogen atom or a methyl group].

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7. The process of claim 3 wherein in the said process of chlorination, sequence of steps involves addition of sucrose-6-ester solution in a tertiary amide to the chlorinating reagent for chlorination.

8. The process of claim 7 wherein the said tertiary amide is N, N-  
5 dialkylformamide.

9. The process of claim 8 wherein the said N, N-dialkylformamide is dimethylformamide.

10. The process of claim 1, wherein the chlorinated sucrose containing liquid contains chlorinated sucrose in pure form with impurities in small or trace  
10 quantities.

11. The process of claim 10 wherein the said chlorinated sucrose containing liquid, is a wash solvent collected as effluent from a column chromatography of an impure solution of chlorinated sucrose.

12. The process of claim 11 wherein the said wash solvent is subjected to  
15 concentration before subjecting to drying treatment.

13. The process of claim 11 wherein the said wash solvent used for desorption is either a single solvent like ethyl acetate, or mixture of solvents like mixture of toluene and methanol or mixture of methanol or water & ethyl acetate.

14. The process of claim 11 when the said column chromatography is done by using a suitable adsorbent preferably, alumina or silica gel.

15. The process of claim 11 when the said impure solution is the crude extract of chlorinated sucrose (or its intermediates or derivatives) from a solid powder mixture of several chemicals, including chlorinated sucrose; extraction being done by any suitable extraction process including supercritical extraction or by conventional extraction in any suitable solvent including water, ethyl acetate, methanol, methyl ethyl ketone, acetone, which are capable of selective extraction of substantially pure form of chlorinated sucrose free from impurities.

16. The process of claim 12 wherein the concentrated extract is subjected to conventional crystallization for purification of chlorinated sugar.

17. The process of claim 3, wherein the said process of chlorination comprises of:

15           i) preparation of Vilsmeir reagent from Phosphorus oxy-chloride,

                 ii) addition of sucrose-6-ester, preferably sucrose-6-acetate, to Vilsmeier reagent at 5° to 10°C. and allowing reaction to complete,

                 iii) heating the reaction mixture to 80° to 100°C., preferably between 90° to 95°C. and maintained for half to one hour,

- iv) raising temperature of reaction mixture of step no. (iii) to 110°C., preferably to 120.° to 130°C. and maintained for 3-5 hours,
- 5 v) cooling the reaction mass to room temperature, cooling the reaction mass into a solution of a suitable deacylating reagent in inorganic basic solution like alkali hydroxide solution accompanied by further cooling to keep the temperature below 30° to 35°C.,
- vi) adjusting the pH to 7 to 9.5 and preferably 8-9.

18. The process of claim 17 wherein at step no. v), wherein any alkoxide, 10 preferably Potassium Methoxide or Sodium Methoxide is used instead of alkali metal oxides for deacylation..

19. The process of claim 17 wherein pH is adjusted only up to 9 and reaction mixture is subjected to removal of liquids from the said solution by direct drying, under conditions mild enough to prevent degradation or modification 15 of chlorinated sucrose, for recovery of solids from the said liquids and the end product of such operations is a solid mass of the chemicals visibly free from the said liquid.

20. The process of claim 1 wherein the solids obtained from drying of reaction mixture from chlorination step are extracted for chlorinated sucrose recovery 20 by any suitable method of extraction, including, solvent extraction.

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21. The process of claim 11 wherein the said impure solution is the solution of the solid powder mixture of several chemicals, including chlorinated sucrose, made in water and subjected to purification by application of separation methods including column chromatography, extraction in water 5 immiscible solvent having selective affinity with chlorinated sucrose or chlorinated sucrose intermediates or chlorinated sucrose derivatives

22. The process of claim 11 when the said impure solution is the crude extract of chlorinated sucrose (or its intermediates or derivatives) from a solid powder mixture of several chemicals, including chlorinated sucrose; 10 extraction being done by water and the water extract being subjected to a any suitable extraction process including to conventional extraction in any suitable solvent, including ethyl acetate, methanol, methyl ethyl ketone, acetone, which are capable of selective extraction of substantially pure form of chlorinated sucrose free from impurities.

15 23. A solid powder form of a chlorinated sucrose, its intermediates, its derivatives of process of claim 1, at a least part of which is amorphous or non crystalline.

24. Chlorinated sucrose, its intermediates, its derivatives of claim 23 which comprises of :

20 i) average particle size of 8 micron or less, within a range of 5 micron to 8 micron.

- ii) residual moisture content of 10% or less, more particularly less than 5%, still more particularly less than 0.5%.

25. Chlorinated sucrose, its intermediates, its derivatives of chlorinated sucrose, its intermediates, its derivatives, at least a portion of which 5 comprises of particles less than 20 micron precipitated as microcrystalline particles directly from a process of crystallization.

26. Chlorinated sucrose, its intermediates, its derivatives of claim 25 which comprises of:

- i) average particle size distribution of 12 micron or less, majority of 10 particles being within a range of 8 micron to 10 micron
- ii) various shapes ranging from globular particles to fully crystallized needles
- iii) residual moisture content of 10 % or less, more particularly less than 0.5%, still more particularly less than 0.3%

15 27. Chlorinated sucrose, its intermediates, its derivatives at least a part of which consists of amorphous or non crystalline or of particles less than 20 micron microcrystalline particles produced directly from a process of crystallization.

28. An oral composition, ingestible as well as non-ingestible including a 20 toothpaste and a chewing gum, a food, a beverage; high intensity sweetener

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composition; in solid, semi-solid or liquid form, to which is added a composition of chlorinated sucrose of claim 23.